



SLOVENSKI STANDARD SIST EN 50341-2-24:2019

01-december-2019

Nadzemni električni vodi za izmenične napetosti nad 1 kV - 2-24. del: Nacionalna normativna določila (NNA) za Romunijo (na podlagi EN 50341-1:2012)

Overhead electrical lines exceeding AC 1 kV - Part 2-24: National Normative Aspects (NNA) for Romania (based on EN 50341-1:2012)

iTeh STANDARD PREVIEW

Lignes électriques aériennes dépassant 1 kV en courant alternatif - Partie 1: Exigences générales - Spécifications communes

[SIST EN 50341-2-24:2019](http://standards.itih.si/catalog/standard?id=50341-2-24-2019)

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EUROPEAN STANDARD

EN 50341-2-24

NORME EUROPÉENNE

EUROPÄISCHE NORM

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English Version

Overhead electrical lines exceeding AC 1 kV - Part 2-24:
National Normative Aspects (NNA) for Romania (based on EN
50341-1:2012)

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CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

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European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

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European foreword

1. The Romanian National Committee (NC) is identified by the following address:

Romanian Standards Association (ASRO)
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Name of the relevant technical body: Romanian Technical Committee no 165 "Overhead electrical lines" (ASRO/CT 165 - *Linii electrice aeriene*);
Attention: Secretary of ASRO/CT 165 – Standardisation Division

2. The Romanian NC has prepared the present EN 50341-2-24 (Part-2-24), listing the Romanian National Normative Aspects under its sole responsibility and duly passed this document through the CENELEC and CLC/TC 11 procedures.

NOTE The Romanian NC takes full responsibility for the satisfactory technically correct co-ordination of the present EN 50341-2-24 with EN 50341-1:2012. Any quality control/assurance checks necessary have been performed. However, it should be noted that such quality control/assurance has been performed under the general responsibility of the Romanian NC pursuant to national laws and regulations.

3. Part-2-24 is normative in Romania and informative for the other countries.

4. Part-2-24 shall be read in conjunction with EN 50341-1:2012 (Part 1). All clause numbers used in the present Part-2-24 correspond to the numbering in Part 1. Specific sub-clauses that are prefixed "RO" shall be read as amendments to the relevant text in Part 1. All requests for clarification relating to the application of Part-2-24 in relation to Part 1 shall be sent to the Romanian NC who will, in co-operation with CLC/TC 11, clarify the requirements.

Where no reference is made in this Part-2-24 to a specific sub-clause, then Part 1 shall apply.

5. For the "boxed values" defined in Part 1, any amended values, which are defined in Part-2-24, shall be taken into consideration in Romania. However, any boxed value, whether in Part 1 or in Part-2-24, shall not be amended in the direction of greater risk in a Project Specification.
6. The Romanian regulations and standards relating to the overhead electrical lines exceeding A.C. 1 kV, which are specifically used in the present Part 2-24, are listed in the sub-clauses 2.1/RO.2.1.1 to 2.1/RO.2.1.4.

NOTE All national standards referred to in the present Part-2-24 will be replaced by the related European Standards as they become available and are declared applicable by the Romanian NC and therefore reported to the secretariat of CLC/TC 11.

0 Introduction

0.7 Language

(ncpt) RO.1 Language

This standard is published in English and Romanian languages.

1 Scope

1.1 General

1.1 RO.1 General

(ncpt) This Part 2-24 gives the requirements for planning, design and construction of overhead electrical lines with nominal voltages exceeding A.C. 1 kV operating at 50 Hz frequency.

The present Part 2-24 is not applicable for existing overhead electrical lines unless specifically required by Project Specification. The power installations of overhead lines, that are in different stages of design or construction, can be finalised in conformity with the standards in force at project beginning.

For the application of this standard for specific requirements relating to modernization, increasing safety and transport capacity of existing overhead lines, reference shall be specified in the Project Specification. At the same time, the correlation between relevant regulations and associated standards shall be established in the Project Specifications.

The extension of existing electrical lines is considered as new overhead lines, except the junction points that shall be detailed in the Project Specifications.

1.2 Field of application

1.2 RO.1 Overhead electrical lines with insulated conductors

(ncpt) This Part 2-24 is applicable for the design and construction of overhead electrical lines with insulated conductors where the internal and external clearances can be smaller than those specified in Part 1 (SR EN 50341-1:2013).

2 Normative references, definitions and symbols

2.1 Normative references

2.1 RO.1 Application of normative references in Part 1

(A-dev) The normative references in Part 1 (SR EN 50341-1:2013) are applicable, unless otherwise specified in this Part 2-24. In Romania, for purpose of Part 2-24, the Eurocodes series given in sub-clause 2.1 of Part 1, that are adopted as national standards, shall mandatory apply.

2.1 RO.2 References to Romanian national laws, regulations and standards

(A-dev) The following national acts and normative documents contain provisions for planning, design, construction and mounting of the overhead electrical lines. These national acts and normative documents (technical regulations, standards and codes of practice) are referred to in the text in such way that some or all their content constitute requirements of this Part 2-24 and are indispensable for its application. At the time of publication, the editions indicated were valid.

Having in view that all normative documents are subject to revision, the parties to agreements based on this standard shall investigate the possibility of using the latest edition of referenced documents.

2.1 RO. 2.1.1 National laws and regulations

(A-dev) The following normative acts are national laws and regulations.

Reference	Title
Low No. 107:1996	The low of waters (with subsequent modifications and additions); <i>Legea apelor (cu modificările și completările ulterioare)</i>
Law No. 123/2012	Law on Electricity and Natural Gases (with subsequent modifications and additions); <i>Legea energiei electrice și a gazelor naturale (cu modificările și completările ulterioare)</i>
Low No. 137:1995	The low of environment protection (with subsequent modifications and additions); <i>Legea protecției mediului (cu modificările și completările ulterioare)</i>
Ordinance No. 43/1997	Ordinance concerning legal status of roads; <i>Ordonanța privind regimul juridic al drumurilor</i>
Ordinance No. 195/2005	Government Emergency Ordinance on Environmental Protection, (approved with amendments and completions by Law no. 265/2006, as subsequently amended and supplemented); <i>Ordonanța de urgență a Guvernului privind protecția mediului (aprobată cu modificări și completări prin Legea nr. 265/2006, cu modificările și completările ulterioare)</i>
Decree No. 237/1978	Decree for the establishment of normatives concerning systematization, location, construction, and repairing work of the overhead electrical lines passing through forests and over agricultural lands; <i>Decret pentru stabilirea normativelor privind sistematizarea, amplasarea, construirea, repararea liniilor electrice care trec prin păduri și terenuri agricole</i>
ANRE Order No. 49/2007	https://standards.iteh.ai/catalog/standards/sist/62ec01ea-9fb0-4a05-bf62-ccc79c96187e/sist/50341-2-24:2019 National Energy Regulatory Authority (ANRE) - Order no. 49/2007 for amending and completing the Technical Norm regarding the delimitation of the protection and safety areas related to the energy capacities - approved by the Order of the President of the National Energy Regulatory Authority no. 4/2007; <i>Ordinul nr. 49/2007 pentru modificarea și completarea Normei tehnice privind delimitarea zonelor de protecție și de siguranță aferente capacităților energetice - aprobată prin Ordinul președintelui Autorității Naționale de Reglementare în Domeniul Energiei nr. 4/2007</i>
Order No. 135/2010	Ministry of Environment and Forests – Order concerning the Approval of methodology for the implementation of environmental impact assessment for public and private projects; <i>Ministerul Mediului și Pădurilor – Ordin privind Aprobarea metodologiei de aplicare a evaluării impactului asupra mediului pentru proiecte publice și private</i>
M.A.P.M. Order No. 860/2002	Ministry of Waters and Forests - Order concerning the Approval of the Environmental Impact Assessment Procedure and Environmental Agreement; <i>Ministerul Apelor și Pădurilor - Ordin privind Aprobarea Procedurii de evaluare a impactului asupra mediului și de emitere a acordului de mediu</i>
M.A.P.M. Order No. 863/2002	Ministry of Waters and Forests - Order concerning the Approval of methodological guides applicable to the stages of the environmental impact assessment framework-procedure; <i>Ministerul Apelor și Pădurilor - Ordin privind Aprobarea ghidurilor metodologice aplicabile etapelor procedurii-cadru de evaluare a impactului asupra mediului</i>

2.1 **RO.2.1.2 Technical regulations**

(A-dev) The following normative documents are national technical regulations.

Reference	Title
NTE 001/03/00	Insulation selection, insulation coordination and protection of electrical power installations against lightning overvoltages; <i>Normativ privind alegerea izolației, coordonarea izolației și protecția instalațiilor electroenergetice împotriva supratensiunilor</i>
NTE 003/04/00	Normative for construction of overhead transmission lines with nominal voltages exceeding 1000 V (NTE 003/04/00 is under revision); <i>Normativ pentru construcția liniilor aeriene de energie electrică cu tensiuni peste 1000 V</i> (NTE 003/04/00 este în curs de revizuire);
NTE 007/08/00	Design and execution of electric cable networks; <i>Normativ pentru proiectarea și executarea rețelelor de cabluri electrice</i>
PE 022/87	General requirements for design of electrical grids; <i>Prescripții generale de proiectare a rețelelor electrice</i>
PE 101/85	Normative for construction of electrical installations of connexions and transformers with voltages exceeding 1 kV; <i>Normativ pentru construcția instalațiilor electrice de conexiuni și transformare cu tensiuni peste 1 kV</i>
PE 101A/85	Guidelines for setting the clearances concerning the coexistences of the electric power installations with nominal voltages exceeding 1 kV with other constructions; <i>Instrucțiuni privind stabilirea distanțelor normate privind amplasarea instalațiilor energetice cu tensiunea peste 1 kV în raport cu alte construcții</i> https://standards.iteh.ai/catalog/standards/sist/62ec01ea-9fb0-4a05-bf62-b44364436443
PE 103/92	Design and checking for electric power installations at mechanical and thermal stresses in conditions of short circuit currents; <i>Instrucțiuni pentru dimensionarea și verificarea instalațiilor electroenergetice la solicitări mecanice și termice, în condițiile curenților de scurtcircuit</i>
PE 116/94	Normative for tests and measurements performed on electrical installations and equipments. <i>Normativ de încercări și măsurări la echipamente și instalații electrice</i>
PE 125/89	Guidelines concerning coexistence coordination of the electrical installations of 1 ÷ 750 kV and telecommunication lines; <i>Instrucțiuni privind coordonarea coexistenței instalațiilor electrice de 1÷750 kV cu liniile de telecomunicații</i>
PE 127/83	Rules on technical exploitation of overhead electrical lines; <i>Regulament de exploatare tehnică a liniilor electrice aeriene</i>
ID17	Normative concerning the design, execution, checking and commissioning of electrical installations in the areas with explosion hazard (Petro- and Chemistry Industry Minister); <i>Normativ pentru proiectarea, execuția, verificarea și recepționarea de instalații electrice în zone cu pericol de explozie (Ministerul Industriei Chimiei și Petrochimiei)</i>
C 170/2007	Normative concerning corrosion protection of elements from reinforced concrete and prestressed concrete located in aggressive atmospheric environments; <i>Normativ privind protecția anticorozivă a elementelor din beton armat și beton precomprimat situate în medii agresive atmosferice</i>

M 34/80 Technical norms concerning the safety areas of aeronautic lands, developed by Civil Aviation Department; *Norme tehnice privind zonele de siguranță ale terenurilor de aeronautică, elaborate de Departamentul Aviației Civile*

2.1 RO.2.1.3 Codes of practice

(ncpt) The following documents are recommended to be used as codes of practice for design and construction of overhead electrical lines.

Reference	Title
I.LI-Ip4/17-2012	Design and execution of medium voltage overhead lines equipped with twisted pair cables, hanging wire included or self support; <i>Îndrumar de proiectare și execuție pentru linii electrice aeriene de medie tensiune cu cabluri torsadate cu sau fără fir purtător</i>
1.LI- Ip 28–1994	Design concerning the coexistence conditions of overhead electrical lines with telecommunications networks; <i>Îndreptar de proiectare privind condițiile de coexistență a liniilor de energie electrică cu liniile de telecomunicații</i>
1RE-Ip30-2004	Design and execution of earthing systems; <i>Îndreptar de proiectare și execuție a instalațiilor de legare la pământ</i>
1E Ip 35/1-2004	Design of medium voltage networks with earthed neutral through the resistance; <i>Îndreptar de proiectare pentru rețele de medie tensiune cu neutru legat la pământ prin rezistență</i>
1LI-Ip38	Design of high voltage overhead lines – Proximities and crossings of high voltage overhead lines of 110–400 kV to the other installations; <i>Îndreptar pentru proiectarea liniilor electrice de înaltă tensiune - Apropieri și traversari ale liniilor electrice de înaltă tensiune de 110–400 kV față de alte instalații</i>
1.E-Ip 38 /1989	Use of land surfaces required for thermal power plants, electrical grids and district heating grids; <i>Îndreptar pentru folosirea suprafețelor de teren necesare pentru termocentrale, rețele electrice și rețele de termoficare</i>
1.E-Ip 69-1991	Selection of optimal solutions of warning systems of towers and conductors of overhead electrical lines; <i>Îndreptar pentru alegerea soluțiilor optime de balizare a stâlpilor și conductoarelor liniilor electrice aeriene</i>
1.LI-Ip 33-1983	Design and construction of overhead electrical lines with nominal voltage of 110 kV, 220 kV and 400 kV in the areas with strong meteorological phenomena; <i>Instrucțiuni de proiectare și construcții pentru linii electrice aeriene de 110 kV, 220 kV și 400 kV în zone cu fenomene meteorologice intense</i>
3RE-Ip41-1992	Design and operation concerning the protection against influences determined by the proximities between overhead electrical lines; <i>Instrucțiuni de proiectare și exploatare privind protecția împotriva influențelor datorate apropiierilor dintre liniile electrice aeriene</i>

2.1 RO.2.1.4 Romanian standards

(ncpt) The following normative documents are Romanian standards and European/international standards adopted as national standards.

Reference	Title
SR 438-1:2012	Steel products for concrete reinforcement - Part 1: Hot rolled structural steel. Grades and quality technical requirements; <i>Produse de oțel pentru armarea betonului - Partea 1: Oțel beton laminat la cald. Mărci și condiții tehnice de calitate</i>
SR 438-2:2012	Steel products for concrete reinforcement - Part 2: Cold drawn round wire; <i>Produse de oțel pentru armarea betonului - Partea 2: Sârmă rotundă trefilată</i>
SR 438-3:2012	Steel products for reinforcement of concrete - Part 3: Welded fabric; <i>Produse de oțel pentru armarea betonului - Partea 3: Plase sudate</i>
SR 832:2008	Influences of electrical installations of high voltage on the communication networks - Prescriptions; <i>Influențe ale instalațiilor electrice de înaltă tensiune asupra liniilor de telecomunicații - Prescripții</i>
SR 2970:2005	Precast columns of reinforced and prestressed concrete for overhead electrical lines - General technical requirements for quality; <i>Stâlpi prefabricați din beton armat și beton precomprimat pentru linii electrice aeriene - Condiții tehnice generale de calitate</i>
SR 6290:2004	Crossings between overhead transmission lines and telecommunication lines; <i>Încrucișări între liniile de energie electrică și liniile de telecomunicații</i>
SR EN 50182	Conductors for overhead lines - Round wire concentric lay stranded conductors; <i>Conductoare pentru linii aeriene - Conductoare cu sârme rotunde cablate în straturi concentrice</i>
SR EN 50183	Conductors for overhead lines - Aluminium-magnesium-silicon alloy wires; <i>Conductoare pentru linii electrice aeriene - Sârme de aliaj de aluminiu-magneziu-siliciu</i>
SR EN 50522:2011	Earthing of power installations exceeding 1 kV a.c.; <i>Legarea la pământ a instalațiilor electrice cu tensiuni alternative mai mari de 1 kV</i>
SR EN 50326:2004	Conductors for overhead lines - Characteristics of greases; <i>Conductoare pentru linii aeriene - Caracteristici ale produselor de protecție</i>
SR EN 60038:2012	CENELEC standard voltages; <i>Tensiuni standardizate de CENELEC</i>
SR IEC 60479 series	Effects of current on human body beings and livestock; <i>Efectele curentului electric asupra omului și animalelor domestice</i>
SR EN 60889:2002	Hard-drawn aluminium wire for overhead line conductors; <i>Sârmă de aluminiu trasă la rece în stare de ecruisare tare pentru conductoarele liniilor aeriene</i>
SR EN 61232:2002	Aluminium-clad steel wires for electrical purposes; <i>Sârme de oțel acoperite cu aluminiu pentru utilizare electrică</i>
SR EN 61284:2000	Overhead lines - Requirements and tests for fittings; <i>Linii electrice aeriene - Prescripții și încercări pentru accesorii</i>

SR EN 61140	Protection against electric shock - Common aspects for installation and equipment; <i>Protecție împotriva șocurilor electrice - Aspecte comune în instalații și echipamente electrice</i>
SR EN 60071-1	Insulation co-ordination - Part 1: Definitions, principles and rules; <i>Coordonarea izolației - Partea 1: Definiții, principii și reguli</i>
SR EN 61936-1:2011	Power installations exceeding 1 kV a.c. - Part 1: Common rules; <i>Instalații electrice cu tensiuni alternative nominale mai mari de 1 kV - Partea 1: Reguli comune</i>
SR EN 62004:2010	Thermal resistant aluminium alloy wire for overhead line conductor; <i>Sârme de aliaj de aluminiu rezistente la căldură pentru conductoarele liniilor electrice aeriene</i>
SR EN 62209-1:2017	Measurement procedure for the assessment of specific absorption rate of human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices - Part 1: Devices used next to the ear (Frequency range of 300 MHz to 6 GHz); <i>Procedură de măsurare pentru evaluarea ratei de absorbție specifice pentru expunerea umană la câmpuri de radiofrecvență produse de dispozitive de comunicație fără fir, ținute în mână sau purtate în apropierea corpului. Partea 1: Dispozitive utilizate în apropierea urechii (Domeniu frecvență de la 300 MHz la 6 GHz)</i>
SR EN ISO 898 series	Mechanical properties of fasteners made of carbon steel and alloy steel; <i>Caracteristici mecanice ale elementelor de asamblare executate din oțel carbon și oțel aliat</i>
SR EN ISO 1461:2009	Hot dip galvanized coatings on fabricated iron and steel articles - Specifications and test methods; <i>Acoperiri termice de zinc pe piese fabricate din fontă și oțel - Specificații și metode de încercare</i>
SR HD 60364 series	Low-voltage electrical installations; <i>Instalații electrice de joasă tensiune</i>
SR IEC 60888	Zinc-coated steel wires for stranded conductors; <i>Sârme de oțel zincate pentru conductoare cablate</i>
SR ISO 3864-1:2016	Graphic symbols - Security signs and colours - Part 1: Design principles for safety signs and safety marks; <i>Simboluri grafice - Culori și semne de securitate - Partea 1: Principii de proiectare pentru semne de securitate și marcaje de securitate</i>
STAS 4068/1-82	Maximum water discharges and storage - Determination of maximum water discharges and storage of watercourses; <i>Debite și volume maxime de apă - Determinarea debitelor și volumelor maxime ale cursurilor de apă</i>
STAS 4068/2-87	Maximum water discharges and storages - Yearly probabilities of maximum water discharges and storages under normal and special working conditions; <i>Debite și volume maxime de apă. Probabilitățile anuale ale debitelor și volumelor maxime în condiții normale și speciale de exploatare</i>
STAS 4273-83	Water constructional works - Integrating with importance classes; <i>Construcții hidrotehnice - Încadrarea în clase de importanță</i>
STAS 6482/1-73	Steel wires and wire products for prestressed concrete - Rules for quality control; <i>Sârme de oțel și produse din sârmă pentru beton precomprimat - Reguli pentru verificarea calității</i>
STAS 6482/2-80	Steel wires and wire products for prestressed concrete - Steel wire; <i>Sârme de oțel și produse din sârmă pentru beton precomprimat - Sârmă netedă</i>

STAS 6482/3-80	Steel wires and wire products for prestressed concrete - Deformed wire; <i>Sârme de oțel și produse din sârmă pentru beton precomprimat - Sârmă ampentată</i>
STAS 6482/4-80	Steel wires and wire products for prestressed concrete - Strands; <i>Sârme de oțel și produse din sârmă pentru beton precomprimat -Toroane</i>
STAS 8074-76	Crossings between the contact wires of tramways and trolleybuses and the overhead electrical lines or overhead telecommunication lines - Requirements; <i>Încrucișări între liniile de contact pentru tramvaie și troleibuze și linii electrice aeriene sau linii aeriene de telecomunicații - Prescripții</i>
STAS 10128-86	Protection against corrosion of above ground steel buildings - Classification of aggressive environments; <i>Protecția contra coroziunii a construcțiilor supraterane din oțel - Clasificarea mediilor agresive</i>
STAS 10166/1-77	Protection against corrosion of above ground steel buildings - Mechanical preparation of surfaces; <i>Protecția contra coroziunii a construcțiilor din oțel supraterane - Pregătirea mecanică a suprafețelor</i>
STAS 10702/1-83	Protection against corrosion of above ground steel buildings - Protection coatings - General technical requirements; <i>Protecția contra coroziunii a construcțiilor din oțel supraterane - Acoperiri protectoare - Condiții tehnice generale</i>

2.2 Definitions

iTeh STANDARD PREVIEW

For purpose of this standard, in addition to the terms and definitions given in Part 1 (SR EN 50341-1), the following terms and definitions apply.

2.2 RO.1

(ncpt)

overhead electrical line

overhead line (in a broad sense, OHL)

ensemble of electrical installations mounted in open air above ground, which serves for transmission and distribution of electrical energy, being composed by conductors, insulators (including fittings and clamps), earthing systems and structural elements (foundations and supports, either towers or poles)

Note 1 to entry: From constructive point of view, the overhead electrical lines can be: single circuit lines, double circuit lines or multiple circuit lines.

[IEV 60050-601, definition 601-03-04 modified]

2.2 RO.1.1

(ncpt)

line section

portion of an overhead electrical line composed by one or more spans in which the line maintains its direction (see Figure 2/RO1)

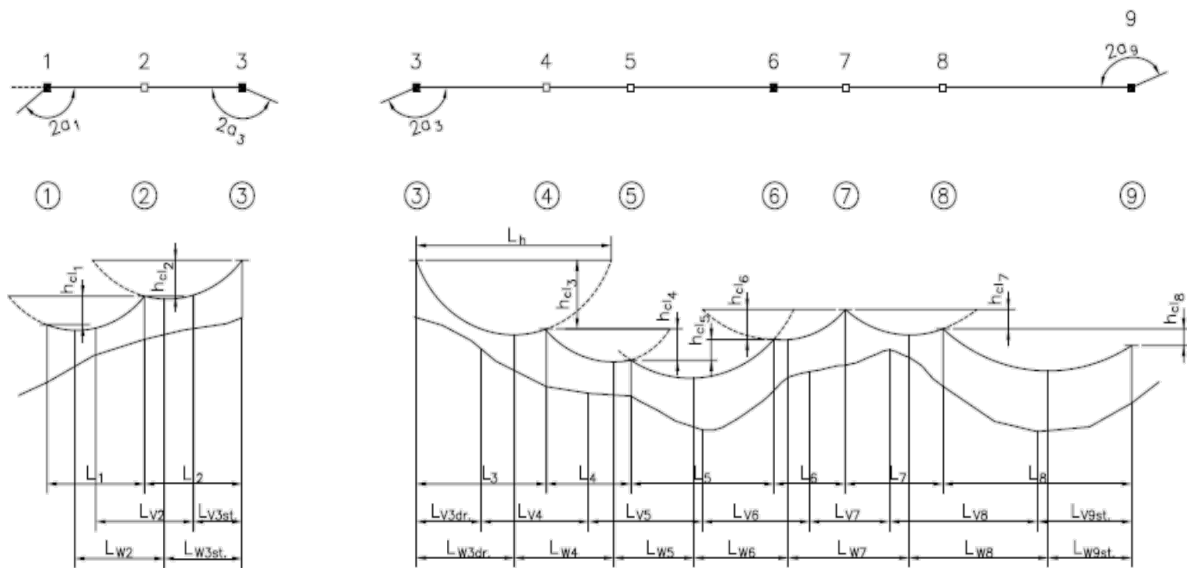
2.2 RO.1.2

(ncpt)

section

line portion composed by one or more spans situated between two consecutive tension supports (see Figure 2/RO1)

[IEV 60050-466, definition 466-03-11 modified]



Key

- Portions of an overhead electrical line situated between the supports 1 and 3 or 3 and 9 are straight lines;
- The supports 1, 3, 6 and 9 may be the angle tension supports or angle suspension supports;
- Portions of an overhead electrical line situated between two angle supports are line sections;
- L_e – nominal span;
- L_i ($i=1...n$) – real spans;
- L_v – wind span;
- L_w – weight span;
- L_h – virtual span;
- h_i ($i=1...n$) – difference in levels;
- f_n – conductor sag corresponding to nominal span;
- h_{cl} – height of conductor's attachment;
- h_g – minimum ground clearance;
- 2α – angle between two adjacent straight lines.

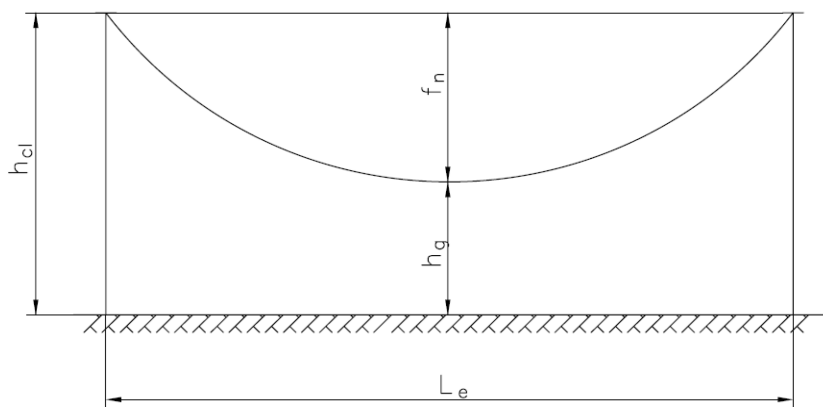


Figure 2/RO.1 – Graphical explanation for the concept of line section, span and difference in levels

- 2.2 (ncpt) **RO.1.3 approval of emplacement (line route)**
written replay given by the grid operator at request of an applicant, which specifies its position on the proposed location of solicited line route
- 2.2 (ncpt) **RO.1.4 right of way for overhead electrical line**
land area situated along the overhead electrical line and airspace above it, which imposes restrictions in terms of overhead line coexistence with natural elements, objects, buildings and their related facilities; the right of way includes the protection area and safety area
- 2.2 (ncpt) **RO.1.5 maintenance corridor of overhead electrical line**
land strip non-arranged along the line route situated between the existing permanent access roads into the area, allowing pedestrian access of operating personnel
- 2.2 (ncpt) **RO.1.6 working corridor of overhead electrical line**
land strip, which can be temporary occupied, located close to the overhead electrical line axis, and usually between the assembly platforms required for installation of conductors, the access of machinery and transport of mounting materials
- 2.2 (ncpt) **RO.1.7 crossing and under-crossing**
those crossings where the line over-cross or under-cross an object
- 2.2 (ncpt) **RO.1.8 crossing of overhead electrical line with an object**
that situation where, on horizontal projection, at least one phase conductor, in normal or deviated position, crosses an object
- 2.2 (ncpt) **RO.1.9 proximity of overhead line to an object**
that situation of proximity when the overhead line doesn't cross an object
- 2.2 (ncpt) **RO.1.10 difference in levels, h_i**
distance vertically measured between the attachment points of conductor at two successive supports (see Figure 2/RO.1)

[IEV 60050-466, definition 466-03-05 modified]
- 2.2 (ncpt) **RO.1.11 span, L_i**
distance horizontally measured between the axes of two consecutive supports (see Figure 2/RO.1)

[IEV 60050-466, definition 466-03-01 modified]
- 2.2 (ncpt) **RO.2 tower / pole**
part of the support consisting of body, earthwire peak(s) and crossarms
- Note 1 to entry: Constructions of metal, reinforced concrete, wood or other materials used to sustain the components of overhead electrical lines above the ground.
- [IEV 60050-466 modified by combination of definitions 466-08-01 and 466-07-01]